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ABSTRACT

Reviewing the scope of mobile facilities utilization as a partial solution to providing educational opportunities for school populations, this synthesis found the literature to indicate that the total and potential usage of mobile facilities is great. After a discussion of types of mobile units, uses of mobile facilities are identified. In general, these uses have included provision of most educational activities presently housed within permanent classrooms as well as provision of public services. Included are 25 references. (MJB)

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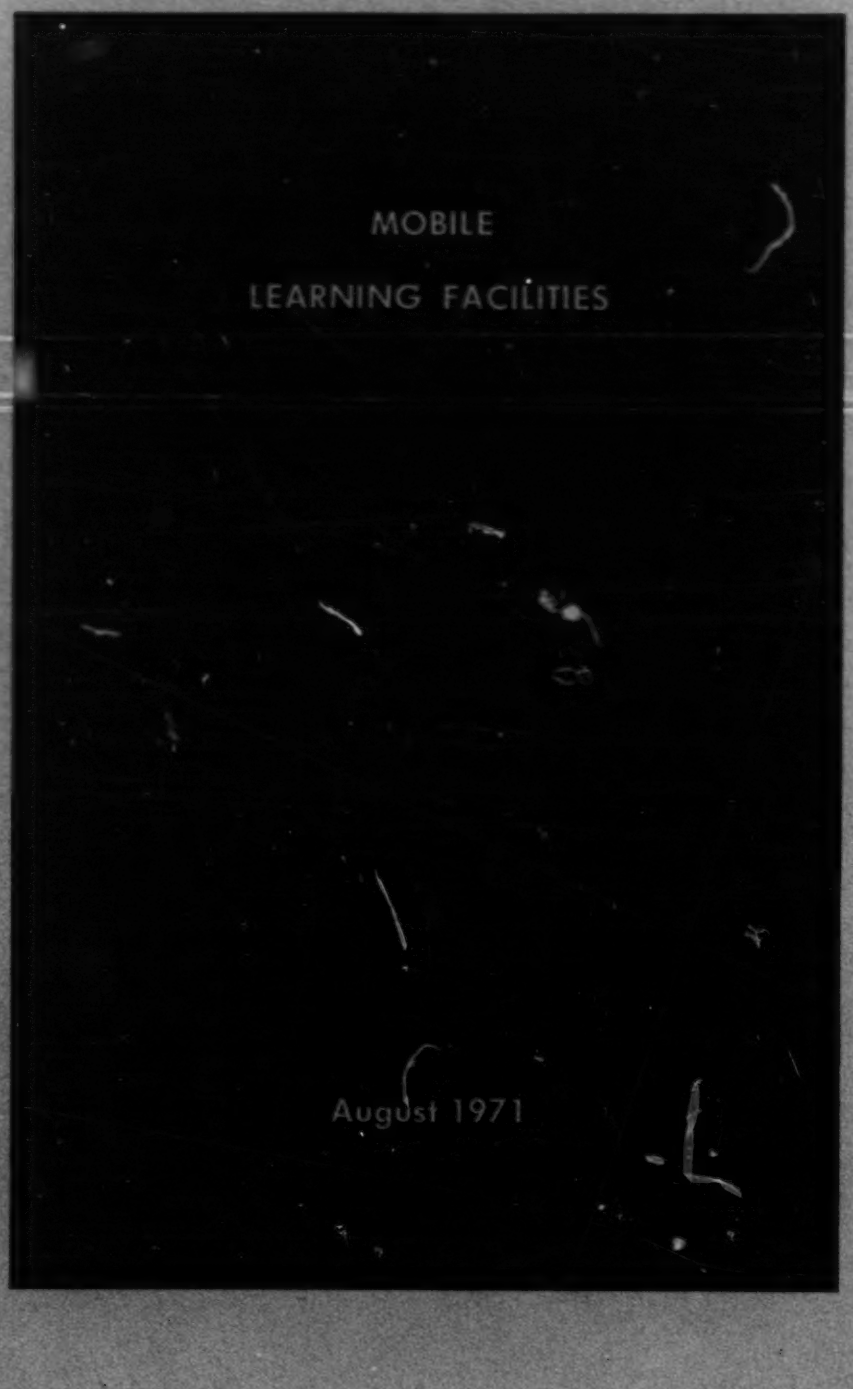
MOBILE LEARNING FACILITIES



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MOBILE LEARNING FACILITIES

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MOBILE LEARNING FACILITIES

INTRODUCTION

Mobility appears to be the watchword of the 70's and 80's. Rural populations continue to migrate to cities. Inner-city residents are moving to the suburbs. Population segments are moving, or are being moved, to different areas of the inner city and to the fringes of population areas. Urban renewal and other Federal projects shift whole segments of populations with limited advance notice, and highway and building projects displace thousands of persons annually. Whole communities may be developed almost overnight. Combine these facts of life with the flow of migrant worker streams and with the day-to-day movement of people changing jobs, and the task of providing adequate social and educational services looms as an ominous, almost impossible, barrier.

Provision of police services, fire protection, street-cleaning services, and markets seems to have become routinized so that, by the time communities are occupied, such amenities are available. Development of other services, however, has followed more slowly.

Conversely, dwindling populations generate insufficient funds to maintain service requirements, sometimes resulting in complete abolition of essential services. Thus the plights of these two types of areas are similar--but for polarized reasons.

The purpose of this paper is to survey some of the applications and the scope of mobile facilities utilization as a partial solution to providing educational opportunities for school populations. Mobile facilities may provide instructional opportunities:

1. when communities develop more rapidly than normal financial capacity can handle;
2. when dwindling populations remove financial support from communities concurrently removing essential programs;
3. when specialized instruction is needed at several such sites and where the demand at any single site is not sufficient to install specialized facilities permanently;

4. when special services such as health care, specialized appraisal, and audiovisual services are to be rotated between campuses;
5. when it is desirable to field-test pilot programs before expending funds for permanent facilities;
6. when it is feasible to regionalize services or instructional programs; or
7. when equalization of educational programs is desired.

Although documentation of systematic cost-benefit and effectiveness studies is extremely sketchy, the literature suggests some trends which indicate an expanding demand for mobile facilities. Additionally, the authors have had limited personal experience in providing certain mobile educational services on a regional basis, and these experiences will be related.

As the use of mobile facilities becomes more prominent, the number of vendors and manufacturers automatically increases to meet the demand. Experience of educators indicates that some manufacturers' products are superior to others, especially new products; therefore, carefully drawn specifications are essential in order to ensure that desired characteristics are built into mobile facilities (although this paper is not intended to address that particular issue).

Types of Facilities

It is highly desirable that descriptions of mobile facilities be expressed in universally accepted terms. However, a casual glance at the literature immediately reveals that a glossary of common, standardized terms has not been developed yet. Thus, the authors have chosen to discuss mobile learning facilities as they may fall into one or more of the categories discussed below.

Mobile, self-contained, non-self-propelled facilities. Mounted in towed trailer- or van-like vehicles, these facilities normally contain all the equipment and furniture necessary to conduct the specific tasks for which they were designed. The units may or may not include a power plant. In the event that a power plant is not included, such units must be capable of using an exterior source.

Mobile, self-contained, self-propelled facilities. This classification includes the majority of the mobile units in use at present. The units essentially feature a separate classroom mounted on a temporary or non-fixed foundation. The units contain heating and cooling units, lights, and possibly plumbing, but must depend upon an exterior source of power and other utilities. Equipment contained in these facilities may be as varied as in any regular classroom.

Within each category of mobile facility, a number of functions may be served. The most common mobile facilities, classified by function, are briefly discussed below.

Regular Classroom Functions. Regular classes of almost any program may be contained in any category of mobile unit; however, in a vast majority of instances, portable self-contained facilities are used.

Simulation. Simulator units contain special equipment which allows instruction to be presented utilizing simulated conditions requiring skill and judgment.

Special-purpose Functions. Mobile facilities serve a number of special-purpose functions. Although these could be served generally by permanent facilities, the lack of full-time demand negates their establishment. Special-function services include a wide range of applications, such as (1) inservice training for specialized personnel; (2) academic and vocational skills development; (3) diagnostic, appraisal, and therapy functions; and (4) specialized uses in industrial, social service, and educational operations.

SCOPE OF UTILIZATION OF MOBILE LEARNING FACILITIES

Contemporarily, the trend toward utilization of mobile learning facilities is substantial. Numerous education-oriented agencies across the country have selected alternatives for instructional improvement and adequacy which feature the use of varying designs of mobile facilities. Educators have become conscious of their responsibility to provide effective learning facilities and, resultantly, have engineered environments characterized by efficiency, effectiveness, and flexibility.

Several configurations of mobile educational facilities are in operation.

Portable Classroom Units

School districts and colleges plagued by increased enrollments and decreasing bonding efficacy have resorted to portable classroom facilities. Demands for immediate facilities expansion caused by unanticipated student influx has been met by many educational enterprises through prefabricated portable classrooms which may be placed at the desired location in minimal time.

Portable classroom facilities are available in diverse character and may be constructed to accommodate needs as they develop. Colleges as well as public schools have relied upon portable installations. Expressing the adequacy of portable structures, an eastern college representative stated:

> These buildings pass the codes for permanent construction and can be left as permanent buildings if desired....These buildings are of a very substantial type and should give us long service with a minimum of maintenance plus the advantage of being able to relocate them.[1]

The scope of utilization of portable facilities varies from a single classroom unit in some cases to a complex arrangement of a sizable quantity of multilevel, interlocked, permanent-appearance structures. Flexibility is an important advantage of portable facilities; consequently, their presence is observed on college, secondary and elementary, and preschool and kindergarten campuses.

Portable facilities have been selected quite frequently when short lead-time was a factor in meeting facility requirements, or where remote areas required educational service projects in the absence of adequate buildings. Head Start programs have expressed considerable dependence upon portable structures to meet immediate short-range needs relative to physical environmental requirements.

A report from Oakland Community College reflects confidence in portable facility utilization:

> The approach to getting maximum benefits from relocatable, transportable buildings seems to be matching anticipated space and program needs....Whether a custom installation or a regular line item, these buildings have measured up to expectations....[2]

Increasingly unique demands upon schools have resulted in additional plant facilities. In describing community involvement and resultant problems focused on schools, one educator remarked:

> ...We have only begun to take advantage of this type of construction. Cafeterias and libraries, now crowded... can be moved into a facility of this type. With community activity increasing in all the schools, here is a chance to develop a community hall next to the permanent school adding immeasurably to the community service concept.[3]

The portable classroom facility has been a focal point of numerous discussions by leading educators in the last few years. In 1967, three nationally recognized men from three fields--education, architecture, and industry--met and discussed subjects of particular and mutual interest. Portable, or demountable, school classrooms were included in their discussions.

Dr. Francis McKeag, Assistant to the General Superintendent of Schools, Chicago, Illinois, referred to the need for semipermanent school buildings that would remain ten to fifteen years in a given community. These structures would follow the requirements of the local building code for permanency but would be constructed in modules of eight-feet length--assembled in any configuration desired--and expeditiously movable when required. McKeag recommended that, for school districts with changing community characteristics where populations are shifting outwardly, it would be advantageous "to build at least one-third or possibly one-half of...[the educational facilities] as demountable structure[s]."[4]

McKeag explained that, typically, when young families move into new communities and raise their children, there is a tendency for the children to leave the area once their schooling is completed. Consequently, few youngsters remain permanently in the attendance area, and demountable portions of school plants may be disassembled and relocated in high attendance locales.[5]

Nationally, many school districts have taken advantage of portable or demountable school facilities; the flexibility and economy of these facilities have contributed substantially to the continuing trend of their utilization. Also, when its needs have been met, one district can rent or sell portables to another district.

Mobile Educational Facilities

Collectively considered, mobile educational facilities--although represented by various designs--offer economy, flexibility, and expediency. The two basic configurations characterizing mobile learning facilities are (1) mobile, self-contained, non-self-propelled structures and (2) mobile, self-contained, self-propelled designs. Internal apparatus and equipment which constitute the self-contained criterion may differ, of course, depending upon the precise purposes of the unit. Focal differences of these mobile units lie in the means by which each is moved from one site to another; one is dependent upon external power sources while the other operates under its own power.

Review of the literature indicates that there is broad utilization of self-propelled and non-self-propelled units by educational and other agencies. Several applications of these facilities are presented below to reflect a perspective of their possibilities.

Migrant Education

Self-propelled laboratories for service to migrant children have been instituted in Oregon and Michigan. These units house library resources which are tailored to relate to varying cultural differences among migrant children. Resource materials reflecting different language orientations are manifest in books, films, and filmstrips to serve the interest differential associated with all children--migrant or otherwise.

In Oregon, a mobile unit was purchased to serve the needs of migrant children in Willamette Valley. The unit is attended by a head teacher, who remains aboard the facility when it is stationed at a school. A second teacher departs from the unit and works within the regular school classroom in lieu of a regular teacher, who enters the mobile unit with selected migrant children. The head teacher utilizes the mobile unit's special resources to train the regular classroom teacher and to supplement the curricular services available to the migrant children, while the teacher assigned to operate in the regular school strengthens the instructional process as a result of her special training and preparation in advance of the scheduled visit.[6] This modus operandi offers direct

instructional services of a supplemental nature to children possessing specific educational needs; the setup concurrently allows enriched staff development to occur via a unique inservice training approach.

Library Services

In recent years, educators have become increasingly concerned with the substantial expenditure required for space and materials necessary to provide professional library services to the students of each school in a district.

Schools in Connecticut have attempted to overcome this problem by assigning funds received under Connecticut State Act 523, "an act similar in intent and purpose to Title I of P.L. 89-10."[7]

Connecticut's plan includes a self-contained, mobile library materials unit which provides semiweekly library services to 2400 elementary students. The mobile unit operates through a central library depository and contains books of diversified content as well as special audiovisual materials and instructional programs. Specifically, the unit contains 2500 volumes, a 16-mm projector, a filmstrip projector, a tape recorder, twenty 8-mm cartridge film projectors, and twenty small cartridge tape recorders, complete with a variety of film and prerecorded tape cartridges.[8]

Reading Services

A mobile reading laboratory was utilized extensively in producing specialized reading services at several schools in Rhode Island. Explaining the general design of the project, the director stated that

> ...fourth, fifth and sixth graders from the Central Grammar, Valley Falls, and St. Patrick's Schools... [complete] their turns at the sound tapes, films, individual projectors, head-sets, record player, word games, and the printed books keyed to the other materials....
>
> Vocabulary details skills, ability to grasp general significance and ability to predict outcomes are measured to determine pupils' need for remedial lessons and their progress in the lessons.[9]

A connected study of the experiment reflected that approximately 50 percent of one group of pupils receiving specialized reading assistance

in the mobile unit brought their reading ability up to normal level for their respective grades.[10] Although one should cautiously accept information of this nature, the point should be made that mobile facilities, when properly equipped and utilized, are apparently conducive to meaningful learning.

Aside from the value of mobile facilities from an instructional frame of reference, the flexibility feature resulting from mobile characteristics is clearly evident here. Additionally, according to the remedial reading director in charge of the unit, "Summer school in the travelab would be one way of reaching more children faster with the reading progress opportunity its facilities can supply...."[11]

Adult Education

In many metropolitan areas across the country, a major problem confronting educators is the inadequately educated general populace. Progress of students, it has been repeated numerous times, is inhibited by home-life patterns which are uncontrollable by the educator. Students have natural tendencies to revert to behaviors exhibited in their homes, even though desirable modifications to their educational life-styles are under way at school.

For years, authorities have attempted to ameliorate the recognized roots of these problems by combating parental educational deficiencies through adult education.

Reaching educationally disadvantaged parents and others has historically proved to be a veritable nemesis. Experiences reflect that, if agencies are successful in recruiting adults into the schools for formalized instruction, maintaining their presence constitutes an even greater problem.

An innovative approach to reaching adult education audiences was accomplished in New York City through use of a specially equipped mobile language laboratory. Latest electronic instructional equipment and materials were installed to assist Puerto Rican target populations to improve their command of the English language, to advance their education, and to improve their economic status.[12]

Teacher Inservice Training

The provision of adequate inservice training of educators has long plagued administration. Personnel who truly contribute to the improvement of the teaching competency of others have typically been in short supply. Although large metropolitan school districts suffer less in this respect due to the generally increased size of their staffs and concomitant resourcefulness, these districts do experience problems in respect to the optimal distribution of such staff competency to target audiences or other educators requiring and/or desiring inservice training.

Mobile educational facilities are operational in several areas of the country for the express purpose of teacher inservice training. An operation of this nature was described thus:

> Johnson County, North Carolina, has a large mobile unit which they [the school district] use for teacher inservice training. This unit is fully equipped with 16mm projector, dry mounting equipment, tape recorder, overhead projector, filmstrip slide projector, record player, and transparency making equipment. The method of presenting this varies at different times. Sometimes the teachers are relieved of duty by a teacher's aide (usually for an hour) while they visit the mobile unit and are taught to operate the various pieces of equipment....[13]

Use of a similar mobile unit has been instituted in Rhode Island with somewhat broader application of the facility than at North Carolina. An elaborate inservice training program for teachers and ancillary personnel is systematized to reach individuals requiring such skills. The Pawtucket School District mobile teacher inservice unit is equipped to instruct in the utilization of educational technology and, additionally, has repair capabilities for servicing virtually any type of audiovisual equipment the district possesses.[14]

There are other configurations of mobile teacher inservice programs that are not limited to only a school district or county area but serve an expansive geographical region.

Colleges have sponsored programs featuring training for educators for which college credit was awarded, and there have been instances where state departments of education have financially sponsored entries of these mobile resource units into their respective states.

Since the origin of the units in 1958, they have reached virtually thousands of educators and have delivered demonstrations of instructional activities previously unavailable.

Media and Audiovisual Services

Although most educationally oriented mobile units feature some provision for the use of educational media, several education agencies have designed and instituted special units to train teachers in this regard. School districts in Louisiana have deployed several mobile units which operate in conjunction with the district's respective media centers.

Schools in Maryland are using audiovisual units to train both teachers and students. Teachers are afforded opportunities to participate in three 50-minute sessions and to follow through with advanced skill development by selecting and completing two mini-courses in various audiovisual instructional areas. These courses are chosen by the teacher participant from a total of fourteen available. Beyond inservice training capabilities, these units offer advantages as mobile resource centers of audiovisual materials.[15]

Graduate Training

In a relatively new scheme, mobile units are being used by several colleges and universities in providing graduate course offerings. In Illinois, a mobile unit is equipped and in service to offer graduate training in special education. The unit, which is stationed at various universities in the state and accommodates classes for teachers and trainees who enroll in summer courses, enables teachers to take highly specialized coursework without leaving their area of residence or employment. Rural areas as well as urban population centers are reached.[16]

One of the most comprehensive uses of mobile facilities in graduate education is in Pennsylvania. An updated mobile unit is scheduled throughout the state and offers graduate courses to teaching personnel unable to attend a university. Highly specialized, the unit contains a central computer with twelve terminals to provide individualized instruction to teachers. Featuring flexibility, the facility provides teachers with an opportunity to schedule courses at their personal convenience

and to complete course requirements at an individual pace.[17]

Vocational Education and Counseling

Attesting that mobile units are operational in diversified educational undertakings, New Jersey has effected a mobile unit in the provision of vocational education.[18]

In Utah, mobile units are functioning in vocational guidance. The MACE (Mobile Assisted Career Exploration) operates in a specially constructed trailer (12' by 44'), which is partitioned into two general service areas: one for small group sessions or one-to-one counseling activities and the second for career exploration under the supervision of a vocational guidance career instructor. The unit is scheduled to visit small, rural schools in southern Utah twice yearly and allows ninth-grade students an opportunity to receive fourteen hours with a professional counselor and/or occupational instructor. Fully equipped, the mobile facility houses brochures, pamphlets, and monographs describing diversified job information as well as procedures a student should follow in responsibly selecting an occupation.[19]

Two additional mobile training facilities operated by Utah State Department of Education provide office occupations and electronics education to predominately rural school students.

Driver Education

From their conceptual beginning in the form of the Link Aircraft Trainers in the 1940's, driver education mobile simulator units have been gaining broad acceptance by numerous educational agencies responsible for driver training.

A quite complex unit when fully equipped, the driver education simulator has almost revolutionized driver instruction. Los Angeles, for example, is using "mobile driving simulators in its high schools. These simulators are heated, air-conditioned, twelve-place units which can be moved from school to school."[20] Although these units lack flexibility for accommodating training activities in other orientations, they do offer observable advantages in serving their precise purpose.

Few adequate long-term evaluations of driver education are available to date, although numerous such studies are being conducted. Early evidence, however, indicates that economy factors associated with simulation are favorable. One advantage lies with reductions in capital expenditures for permanent classroom facilities in each secondary school. Another advantage is the increased student-teacher ratios without apparent loss of the instructor's ability to monitor and assist the student in his learning.

Mobile units for driver education have been purchased by several agencies; however, lease or rental options are popular.[21]

National concern with public safety in the use of automobiles is at a high level. The impact of concern for loss of life and property due to accidents is reflected in the following statement:

> The loss of human and economic resources and the personal tragedies involved in accidents have become a major social problem in the nation. The mounting toll of deaths, personal injuries, and property damage resulting from the increasing number of accidents accompanying the high degree of mechanization achieved during the 20th century has become one of the most important, unsolved problems in the history of the United States....That a nation so conscious of the dignity and personal rights of the individual should continue to tolerate such a needless waste of human lives and suffering of its people is unthinkable. That a nation which has developed such a great economic strength should continue such operational inefficiencies is unbelievable.[22]

The use of simulators is evidence of increased interest in improving the driving competence of the public by initiating safety education when children first learn to drive. Simulators offer the advantage of teaching basic fundamentals of driving before allowing children to control an automobile in actual traffic conditions. Assumedly, some hazards of traffic are eliminated in this process.[23]

A further advantage of the use of simulators is research suitability. Actual traffic conditions normally create so many diverse factors that to measure the singular effect of a given factor is almost impossible. Through simulation, a factor selected for research efforts can be analyzed carefully while holding other ordinarily intervening factors constant.[24]

In Texas, one certified teacher, five aides, a simulator, and four driver education cars provide a state-approved program of instruction to 192 students in six weeks on a consistent basis. Without the simulator and aides, it would require one teacher a complete year to teach 192 students.[25]

Summarily, it may be concluded that many new approaches to improving conventional driver education programs through the use of simulators and multimedia mobile units are being devised. A certainty is that inherent advantages which accrue to such units will continue to be cited.

Other Uses

Throughout the literature appear numerous citations of specialized uses of mobile service and educational units. An uninclusive listing of these is presented to substantiate the apparent sincerity connected with the intensifying trend of mobile facility utilization in special service and educational domains. Mobile units have been used as bookmobiles, fire rescue vehicles, mobile medical units, sales display coaches, patrol wagons, specialized military vehicles, parcel delivery vehicles, speech and hearing units, innovative teaching techniques units, roving diffusion laboratories, helpmobile teacher training units, audiobus student learning units, mobile classrooms, mobile schools (individualized instruction by computer), special diagnostic units, dental examination clinics, complete dental clinics, space science laboratories, library reading rooms, guidance units, diagnostic hearing and speech therapy units, industrial arts units, ambulances, rural health clinics, X-ray clinics, veterinary clinics, special-purpose vehicles, library classroom units, psychological counseling units, field trip units, vision testing clinics, school medical clinics, learning resource centers, rolling study centers, and educational media units.

CONCLUSION

Although several applications of mobile facilities have been cited in this paper, the literature indicates that the total and potential usage of such facilities is obviously far greater. Subsequent studies

will undoubtedly reveal innovative applications.

Casual examination of educational activities reflects that almost any activity, including many areas of physical education programs, may be accommodated in facilities which have varying degrees of mobility. It is increasingly evident that population shifts, limited financial resources, and greater requirements for specialized services mandate the utilization of mobile accommodations.

Scarcity of well-documented evaluation data presents a formidable problem in determining the threshold at which a given activity can be more effectively and efficiently accommodated in a permanent or mobile mode. Longitudinal data are being captured in a number of ongoing programs, but careful scientific treatment of these data is essential if the future decision-maker can depend upon them for program planning. Additionally, carefully structured evaluations must be accomplished in order to stabilize the use of mobile facilities as an option for the decision-maker.

The literature reviewed in this paper, as well as other literature reviewed by the authors, alludes to an additional problem the decision-maker faces but, for the most part, has not satisfactorily mastered. This problem involves selection of appropriate mobile units once they have been deemed necessary.

Vendors have been quick to recognize that a market for new products is beginning to mushroom and, as in most instances when a new market occurs, products of varying quality are appearing. Educators and other users, therefore, must develop design specifications which will assure that facilities chosen will allow the accomplishment of established goals. No comprehensive procedure for developing design specifications was located in the literature.

The educator, or other decision-maker, is confronted by an increasingly more technically and scientifically oriented society. Far-reaching and sophisticated decisions are essential in coping with such a society. Thus, the decision-maker must have multiple options which may be used either as permanent or intermediate solutions, or as pilot operations preceding final decisions.

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